SAMSUNG ELECTRONICS

Approval

Customer : TCL   DATE : Feb. 17. 2012

SAMSUNG TFT-LCD

MODEL : LTA550HQ22

Any Modification of Specification is not allowed without SEC's Permission.

NOTE :

Customer's Approval

SIGNATURE	DATE

APPROVAED BY	DATE
	Feb. 17. 2012
PREPARED BY	DAE
	Feb. 17. 2012

LCD Business

Samsung Electronics Co . , LTD.

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Revision History

Date	Rev. No	Page	Summary
Feb. 17. 2012	000	all	First issued

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General Description

Description

 LTA550HQ22 is a color active matrix liquid crystal display (LCD) that uses amorphous silicon TFT(Thin Film Transistor) as switching components. This model is composed of a TFT LCD panel, a driver circuit and a back light unit. The resolution of a 55.0" is 1920 x 1080 and this model can display up to 16.7 Million colors with wide viewing angle of 89° or higher in all directions. This panel is intended to support applications to provide a excellent performance for Flat Panel Display such as Home-alone Multimedia TFT-LCD TV and High Definition TV

Features

- RoHS compliance (Pb-free)
- High contrast ratio & aperture ratio with wide color gamut
- SVA(Super Vertical Align) mode
- Wide viewing angle (±178°)
- High speed response
- FHD resolution (16:9)
- Low Power consumption
- Edge Type LED (Light Emitted Diode) BLU
- DE (Data Enable) mode
- 2ch LVDS (Low Voltage Differential Signaling) interface

General Information

Items	Specification	Unit	Note
Module Size	1237.4 (H) x 711.3 (V)	mm	±1.0mm
	34.7 (Dmax)		With converter
Weight	15000	g	
Pixel Pitch	0.630(H) x 0.630(W)	mm	
Active Display Area	1209.6(H) X 680.4(V)	mm	
Surface Treatment	Glare		
Display Colors	8bit	colors	
Number of Pixels	1920 x 1080	pixel	
Pixel Arrangement	RGB vertical stripe		
Display Mode	Normally Black		
Luminance of White	400 (Typ.)	cd/m^2	

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1. Absolute Maximum Ratings

If the condition exceeds maximum ratings, it can cause malfunction or unrecoverable damage to the device.

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	V_{DD}	GND-0.3	13.2	V	(1)
Dimming Control	Max. Lum	-	5	V	
Storage temperature	T_{STG}	-20	60	℃	(2)
Operating temperature	T_{OPR}	0	50	℃	
Shock (non - operating)	X,Y,Z	-	30	G	(3)
Vibration (non - operating)	V_{NOP}	-	1.5	G	(4)

Note (1) Ta= 25 ± 2 °C
(2) Temperature and relative humidity range are shown in the figure below.
a. 90 % RH Max. (Ta ≤ 39 °C)
b. Relative Humidity is 90% or less. (Ta > 39 °C)
c. No condensation
(3) 11ms, sine wave, one time for ±X, ±Y, ±Z axis
(4) 10-300 Hz, Sweep rate 10min, 30min for X,Y,Z axis

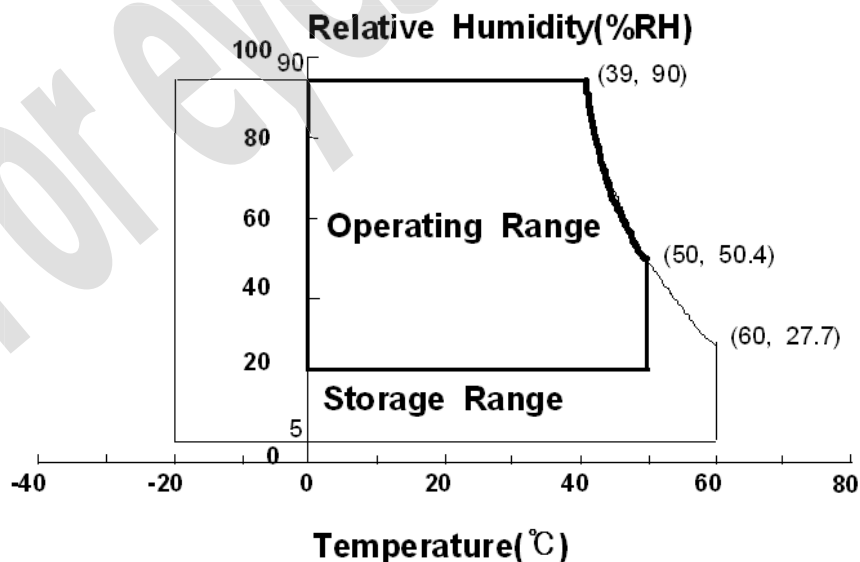**Fig. Temperature and Relative humidity range**

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2. Optical Characteristics

The optical characteristics should be measured in a dark room or equivalent.
Measuring equipment : TOPCON RD-80S, TOPCON SR-3, ELDIM EZ-Contrast

(Ta = 25 $\pm$ 2°C, VDD=12V, fv= 60Hz, f_{DCLK} = 148.5MHz)

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast Ratio (Center of screen)		C/R		3000	4000	-		(1) SR-3
Response Time	G-to-G	Tg		-	6	18	msec	(3) RD-80S
Luminance of White (Center of screen)		Y_L		350	400	-	cd/m^2	(4) SR-3
Color Chromaticity (CIE 1931)	Red	Rx	Normal qL,R =0 qU,D =0 Viewing Angle	TYP. -0.03	0.650	TYP. +0.03		(5),(6) SR-3
		Ry			0.330			
	Green	Gx			0.310			
		Gy			0.600			
	Blue	Bx			0.150			
		By			0.060			
	White	Wx			0.280			
		Wy			0.290			
Color Gamut		-		-	70	-	%	(5) SR-3
Color Temperature		-		7000	10000	-	K	
Viewing Angle	Hor.	qL	C/R≥10	75	89	-	Degree	(6) EZ-Contrast
		qR		75	89	-		
	Ver.	qU		75	89	-		
		qD		75	89	-		
White Brightness Uniformity (9 Points)		B_{uni}		-	-	30	%	(2) SR-3

- Test Equipment Setup

   The measurement should be executed in a stable, windless and dark room between 40min and 60min after lighting the back light at the given temperature for stabilization of the back light. This should be measured in the center of screen.

   Environment condition : Ta = 25 $\pm$ 2 °C

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Photo detector	Field
SR-3	2°
RD-80S	1°

Photo detector

Field

SR-3 : 50㎝
RD-80S : 50㎝

TFT - LCD Module

LCD Panel

The center of the screen
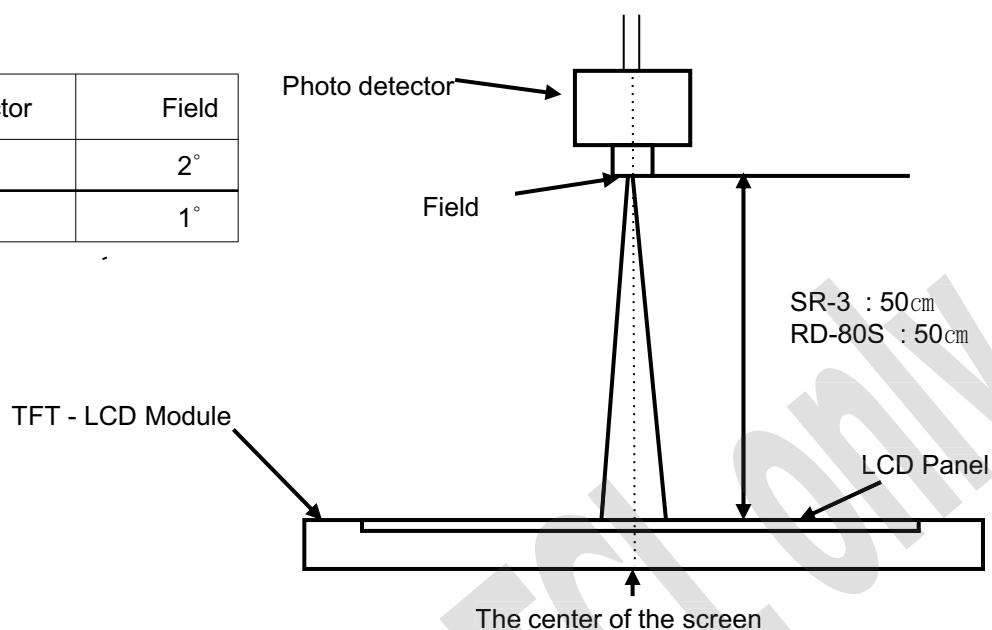
- Definition of test point

320   960   1600

180   ⑨   ⑧   ⑦   Active Area

540   ⑥   ⑤   ④   ◯ Test Point

900   ③   ②   ①
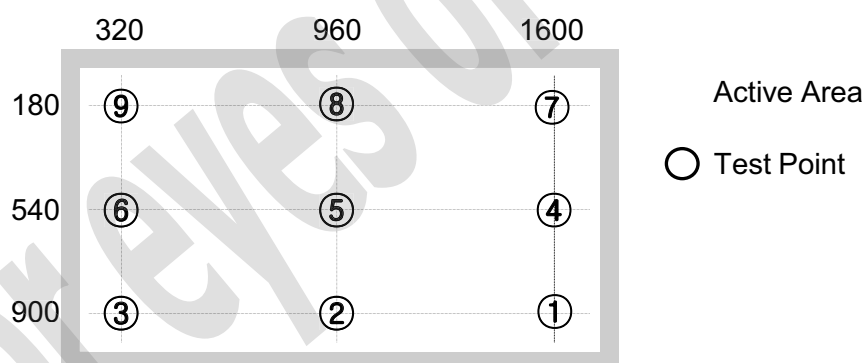
Note (1) Definition of Contrast Ratio (C/R)

: Ratio of gray max (Gmax) & gray min (Gmin) at the center point ⑤ of the panel

$$C/R = \frac{G\max}{G\min}$$

Gmax : Luminance with all pixels white
Gmin : Luminance with all pixels black

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Note (2) Definition of 9 points brightness uniformity (Test pattern : Full White)

$$Buni = 100 * \frac{(B\max - B\min)}{B\max}$$

Bmax : Maximum brightness
Bmin : Minimum brightness

Note (3) Definition of Response time : Sum of Tr, Tf

Display data | Black (data off) | White (data on) | Black (data off)

Optical Instruments Response

T_R T_F

100%
90%

10%
0%

TIME
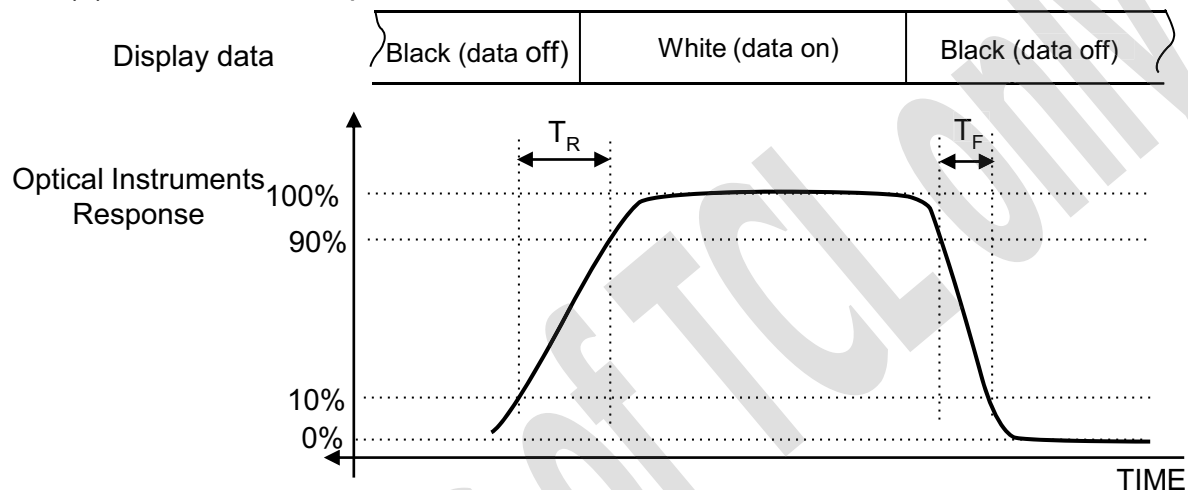
Note (4) Definition of Luminance of White : Luminance of white at center point ⑤

Note (5) Definition of Color Chromaticity (CIE 1931)
       Color coordinate of Red, Green, Blue & White at center point ⑤

Note (6) Definition of Viewing Angle
       : Viewing angle range (C/R ≥10)

Θ_U
Θ_R
Θ_L
Θ_D

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3. Electrical Characteristics

3.1 TFT LCD Module

The connector for display data & timing signal should be connected.

Ta = 25°C ± 2 °C

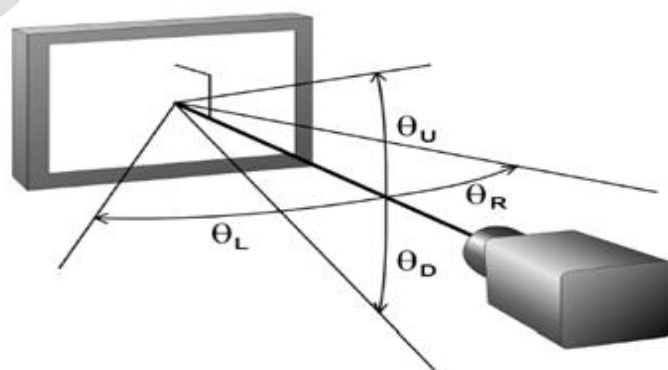| Item		Symbol	Min.	Typ.	Max.	Unit	Note
Voltage of Power Supply		V_{DD}	10.8	12.0	13.2	V	(1)
Current of Power Supply	(a) Black	I_{DD}	-	550	700	mA	(2),(3)
	(b) White		-	650	850	mA	
	(c) N-PTN		-	1100	1500	mA	
Vsync Frequency		f_V	48	60	62.5	Hz	
Hsync Frequency		f_H	60	67.5	70	kHz	
Main Frequency		f_{DCLK}	130	148.5	152.5	MHz	
Rush Current		I_{RUSH}	-	-	4	A	(4)

Note (1) The ripple voltage should be controlled under 10% of V_{DD}.
(2) fV=60Hz, fDCLK = 148.5MHz, V_{DD} = 12.0V, DC Current.
(3) Power dissipation check pattern (LCD Module only)

a) Black Pattern   b) White Pattern   c) N-PTN
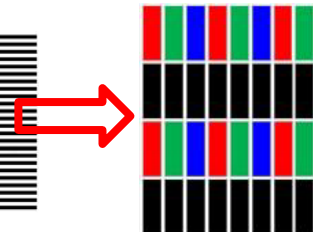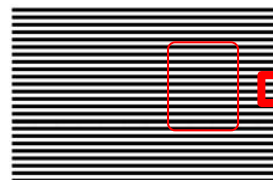
(4) Measurement Conditions

100%
90%

V_{DD}

10%
GND

T_{RUSH}=470μs
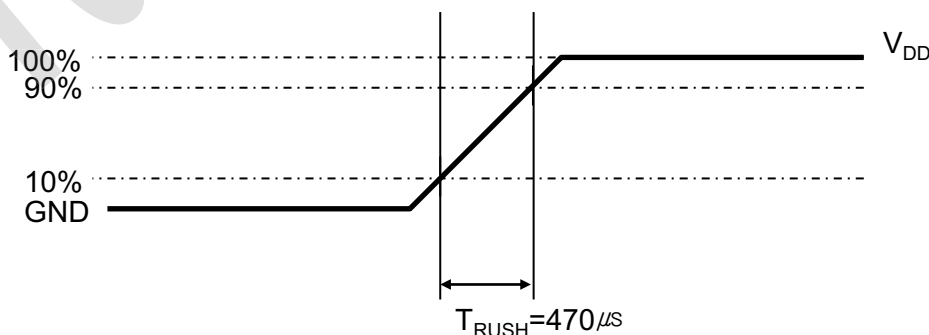
Rush Current I_{RUSH} can be measured when T_{RUSH}. is 470μs.

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3.2 Back Light Unit

The back light unit contains Edge type White LEDs (Light Emitting Diode)

Ta=25 ± 2°C

Control Board

LCD Module

Converter
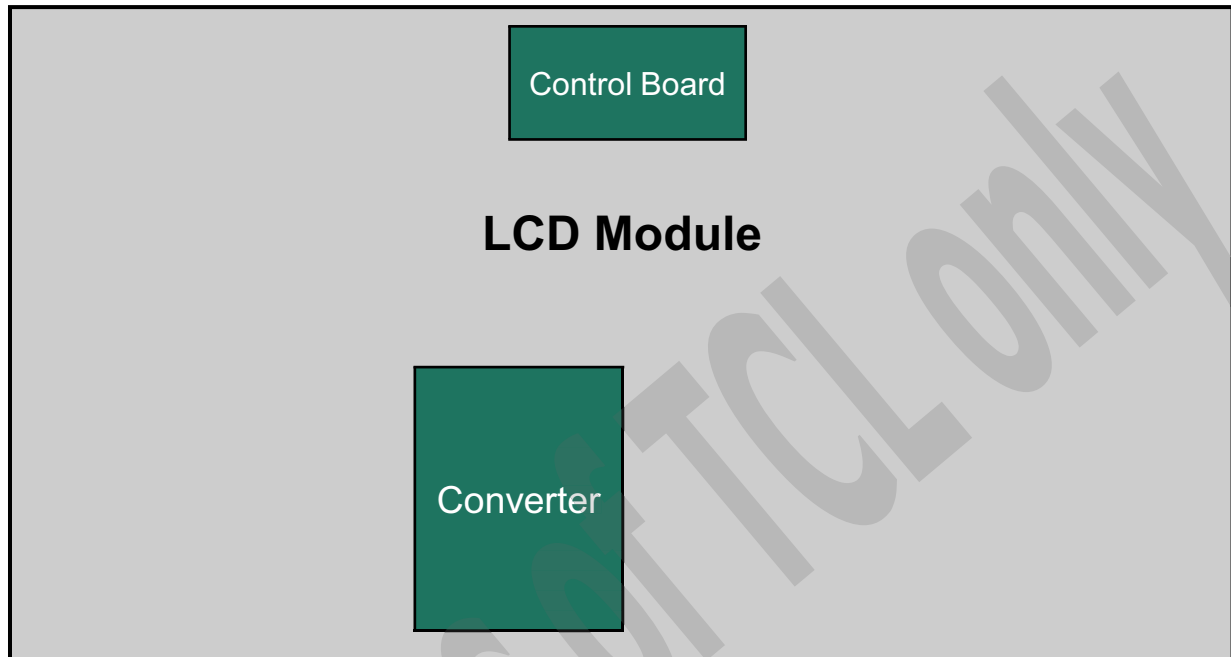
Item	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Life Time	Hr	30,000	-	-	Hour	(1)

Note (1) It is defined as the time to take until the brightness reduces to 50% of its original

value.

[Operating condition : Ta = 25±2℃, For LED package only]

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3.3 Converter Input Condition & Specification

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Items	Symbol	Conditions	Specifications			Unit	Note
			Min.	Typ.	Max.		
Input Voltage	Vin	-	22	24	26	V	Ta=25±2 ℃
Input Current	I_{RUSH}	Vin=24.0V Vdim =3.3V	-	-	4.8	Adc	Normal mode
		3D ENA= ON	-	-	7.5	Adc	Blinking mode
Backlight On/Off	ON	Vin=24.0 V	3	-	5.25	V	
	OFF	Vin=24.0 V	0	-	0.4		
Dimming Range	V_{DIM}	Vin :22~26V	0	-	3.3	V	Note(2)
Dimming Duty Output	D max	Vin=24V Dim:3.3V	-	-	100	%	
	D min	Vin=24V Dim:0V	1	-	-		
Dimming Frequency	F_{PWM}	Vin=24.0 V	140	150	160	Hz	
External Dimming Duty Range	EX_Dim	Vin=22.0~26.0 V Dim Pin(#13):floting	1	-	100	%	
External Dimming Frequency Range	F_{EX_PWM}		-	145	-	Hz	
External Dimming Signal Level	V_{PWM}	High (ON)	3	-	5.25	V	
		Low (Off)	0	-	0.4		

Note (1) All data is measured after 120min warm-up.
Note (2) V_Dim and Ex_Dim are available only at Normal 2D mode. (3D ENA = OFF)
Note (3) Duty = On / (On+Off) * 100
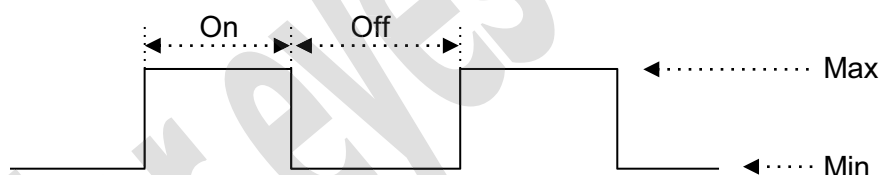
- Additional Appendix for Supply Current (Only for Reference_2D mode)

Items	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input Current	Iin _ overshoot	Vin = 24V, Dim=3.3V (Within 1hr at BLU on)	-	4.0	4.1	A
	Iin _ saturation	Vin = 24V, Dim=3.3V (After 1hr Aging)	-	3.9.	4.0	A
Power Consumption (Back light)	P _ Inrush	Vin=24.0V, Vdim = 3.3V	-	-	115.2	Watt
	P _ overshoot	Vin = 24V, Dim=3.3V (Within 1hr at BLU on)	-	96	98.4	Watt
	P _ saturation	Vin = 24V, Dim=3.3V (After 1hr Aging)	-	93.6	96	Watt

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4. Input Terminal Pin Assignment

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4.1.1 Input Signal & Power

Pin	Description	Pin	Description
1	NC	26	3D EN
2	NC	27	NC
3	NC	28	Rx2[0]N
4	NC	29	Rx2[0]P
5	3D_Sync_O	30	Rx2[1]N
6	GND	31	Rx2[1]P
7	LVDS option *note (2)	32	Rx2[2]N
8	NC	33	Rx2[2]P
9	NC	34	GND
10	NC	35	Rx2CLKN
11	GND	36	Rx2CLKP
12	Rx1[0]N	37	GND
13	Rx1[0]P	38	Rx2[3]N
14	Rx1[1]N	39	Rx2[3]P
15	Rx1[1]P	40	Rx2[4]N *note (1)
16	Rx1[2]N	41	Rx2[4]P *note (1)
17	Rx1[2]P	42	NC
18	GND	43	NC
19	Rx1CLKN	44	GND
20	Rx1CLKP	45	GND
21	GND	46	GND
22	Rx1[3]N	47	NC
23	Rx1[3]P	48	VCC
24	Rx1[4]N *note (1)	49	VCC
25	Rx1[4]P *note (1)	50	VCC
		51	VCC

Note(1) SET Mode 8bit ：Keep [4]channel Floating
         SET Mode 10bit ：Keep [4]channel **level '0'** →
Note(2) If this pin is high(3.3V) → Normal
                    low (GND) → JEIDA
Note(3) 3D format is set with interleave function only

LVCC_33
RxX[X]P
Pin No [23,38]
10kohm
(Pull_Up)
10kohm
(Pull_Down)
RxX[X]N
Pin No [22,37]
GND
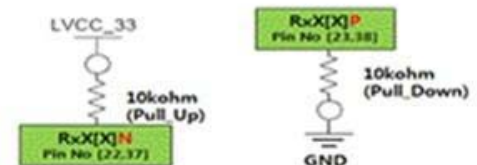
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4.2. Converter Input Pin Configuration

Connector : Yeon-ho, 20022WR-14B1

Pin No.	Pin Configuration(FUNCTION)
	Master
1 ~5	24 V
6~10	GND
11	Error Out
12	Backlight On /Off [ON:3.0 – 5.25 V, OFF: 0 – 0.4 V]
13	Dimming Control [0V:Min, 3.3V:Max] *Note(1)
14	External PWM [1~100 %] *Note(1)

Note(1) If use Dimming Control, Pin 14 Must be N.C
        If use External PWM, Pin 13 Must be N.C

4.3. Converter Input Power Sequence
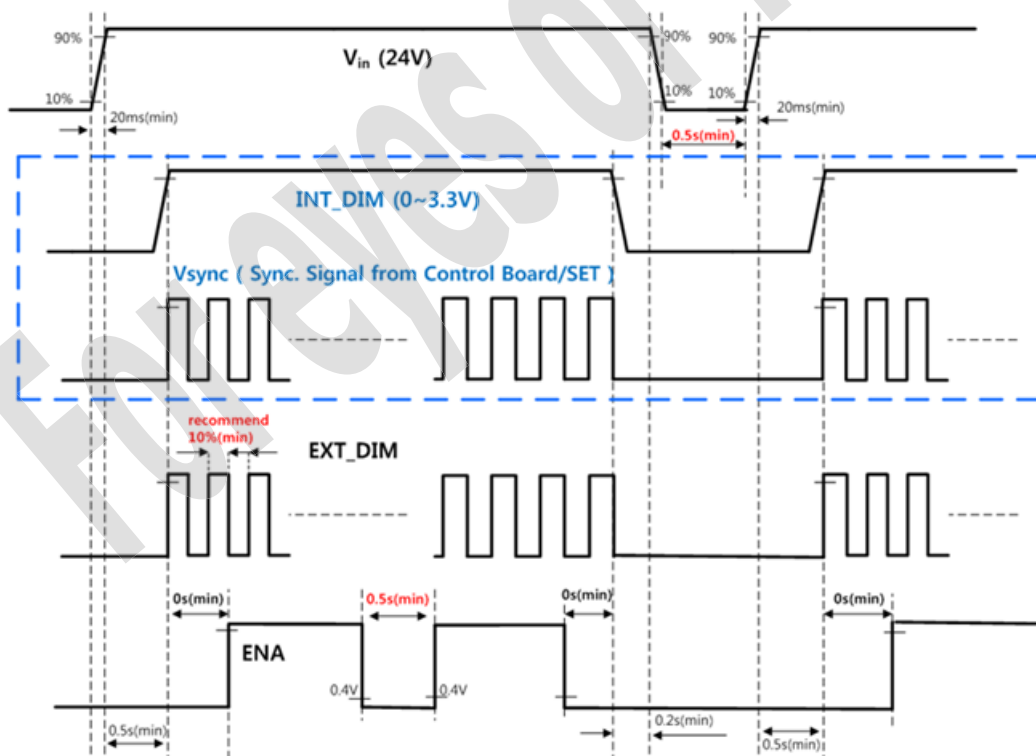
Note) SEQUENCE : ON = Vin(24V) > Dimming Control ≥ Backlight On/Off
                 OFF = Backlight On/Off ≥ Dimming Control > Vin(24V)

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4.4 LVDS Interface
- LVDS Receiver : T-con (merged)
- Data Format

	LVDS pin	JEIDA Data	Normal Data
	TxIN/RxOUT0	R2	R0
	TxIN/RxOUT1	R3	R1
	TxIN/RxOUT2	R4	R2
TxOUT/RxIN0	TxIN/RxOUT3	R5	R3
	TxIN/RxOUT4	R6	R4
	TxIN/RxOUT6	R7	R5
	TxIN/RxOUT7	G2	G0
	TxIN/RxOUT8	G3	G1
	TxIN/RxOUT9	G4	G2
	TxIN/RxOUT12	G5	G3
TxOUT/RxIN1	TxIN/RxOUT13	G6	G4
	TxIN/RxOUT14	G7	G5
	TxIN/RxOUT15	B2	B0
	TxIN/RxOUT18	B3	B1
	TxIN/RxOUT19	B4	B2
	TxIN/RxOUT20	B5	B3
	TxIN/RxOUT21	B6	B4
TxOUT/RxIN2	TxIN/RxOUT22	B7	B5
	TxIN/RxOUT24	HSYNC	HSYNC
	TxIN/RxOUT25	VSYNC	VSYNC
	TxIN/RxOUT26	DEN	DEN
	TxIN/RxOUT27	R0	R6
	TxIN/RxOUT5	R1	R7
	TxIN/RxOUT10	G0	G6
TxOUT/RxIN3	TxIN/RxOUT11	G1	G7
	TxIN/RxOUT16	B0	B6
	TxIN/RxOUT17	B1	B7
	TxIN/RxOUT23	RESERVED	RESERVED

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4.5 Input Signals, Basic Display Colors and Gray Scale of Each Color

COLOR	DISPLAY (8bit)	DATA SIGNAL																								GRAY SCALE LEVEL
		RED								GREEN								BLUE								
		R0	R1	R2	R3	R4	R5	R6	R7	G0	G1	G2	G3	G4	G5	G6	G7	B0	B1	B2	B3	B4	B5	B6	B7	
BASIC COLOR	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
	BLUE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	-
	GREEN	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	-
	CYAN	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-
	RED	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
	MAGENTA	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	-
	YELLOW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	-
	WHITE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-
GRAY SCALE OF RED	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R0
	DARK ↑ ↓ LIGHT	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R1
		0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R2
		:	:	:	:	:	:			:	:	:	:	:	:			:	:	:	:	:	:			R3~R252
		:	:	:	:	:	:			:	:	:	:	:	:			:	:	:	:	:	:			
		1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R253
		0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R254
	RED	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R255
GRAY SCALE OF GREEN	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	G0
	DARK ↑ ↓ LIGHT	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	G1
		0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	G2
		:	:	:	:	:	:			:	:	:	:	:	:			:	:	:	:	:	:			G3~G252
		:	:	:	:	:	:			:	:	:	:	:	:			:	:	:	:	:	:			
		0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	G253
		0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	G254
	GREEN	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	G255
GRAY SCALE OF BLUE	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	B0
	DARK ↑ ↓ LIGHT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	B1
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	B2
		:	:	:	:	:	:			:	:	:	:	:	:			:	:	:	:	:	:			B3~B252
		:	:	:	:	:	:			:	:	:	:	:	:			:	:	:	:	:	:			
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	B253
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	B254
	BLUE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	B255

Note) Definition of Gray :
     Rn : Red Gray, Gn : Green Gray, Bn : Blue Gray (n = Gray level)
     Input Signal : 0 = Low level voltage, 1 = High level voltage

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5. Interface Timing

5.1 Timing Parameters (DE mode)

SIGNAL	ITEM	SYMBOL	MIN.	TYP.	MAX.	Unit	NOTE
Clock	Frequency	$1/T_C$	130	148.5	152.5	MHz	-
Hsync		F_H	60	67.5	70	KHz	-
Vsync		F_V	48	60	62.5	Hz	-
Vertical Display Term	Active Display Period	T_{VD}	-	1080	-	Lines	-
	Vertical Total	T_V	1110	1125	1400	Lines	-
Horizontal Display Term	Active Display Period	T_{HD}	-	1920	-	Clocks	-
	Horizontal Total	T_H	2092	2200	2348	clocks	-

Note) This product is DE mode. But the Hsync & Vsync signal must be inputted

(1) Test Point : TTL control signal and CLK at LVDS Tx input terminal in system
(2) Internal VDD = 3.3V
(3) Spread spectrum
 - Modulation rate (max) : $\pm$ 1.5 %
 - Modulation Frequency : under 100KHz

5.2 LVDS Input Data Characteristics

ITEM		SYMBOL	Min.	Typ.	Max.	UNIT	NOTE
Input Data Position	F_{IN}=78MHz	t_{RSRM}	-	-	450	ps	
		t_{RSLM}	-450	-	-	ps	
Input common mode voltage		V_{CM}	0.3	-	1.8	V	-
Differential Input Voltage		$|V_{ID}|$	100	-	600	mV	-

Note) When the skew is measured the Spread Spectrum should be 0%
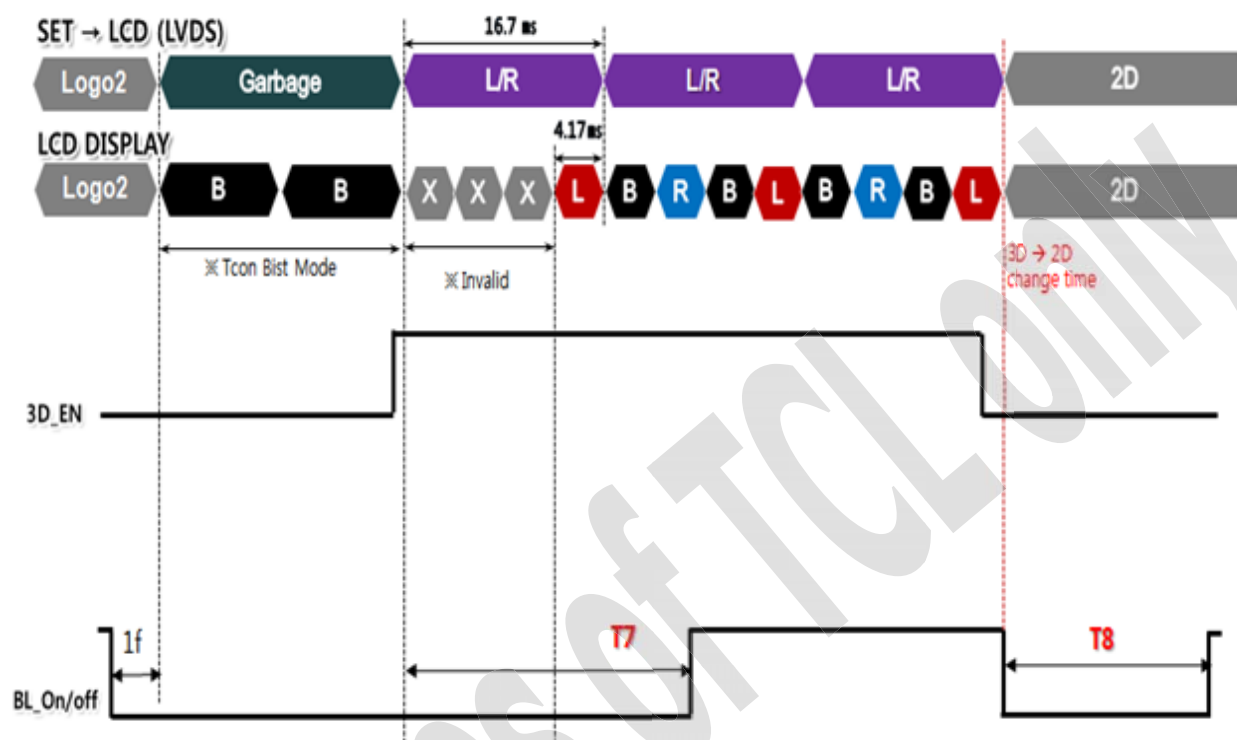
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5.3 3D mode Sequence

5.3.1 3D Sequence

Timing	Spec (ms)			Description
	Min.	Typ.	Max	
T7	≥ 42			Backlight should be on after 10 frame when 3D signal input from SET
T8	≥ 30			Backlight should be off after 7 frame when 3D signal change to 2D signal from SET

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5. 4 Timing diagrams of interface signal (DE mode)

T_V

T_{VD} T_{VB}

DE

T_H

T_{HD}

DE

D_{CLK} T_C

DATA
SIGNALS

T_C

T_{CH} T_{CI}

D_{CLK} 0.5 V_{CC}

T_{DS} T_{DH}

DISPLAY
DATA   0.5 V_{CC}

T_{ES}

DE   0.5 V_{CC}

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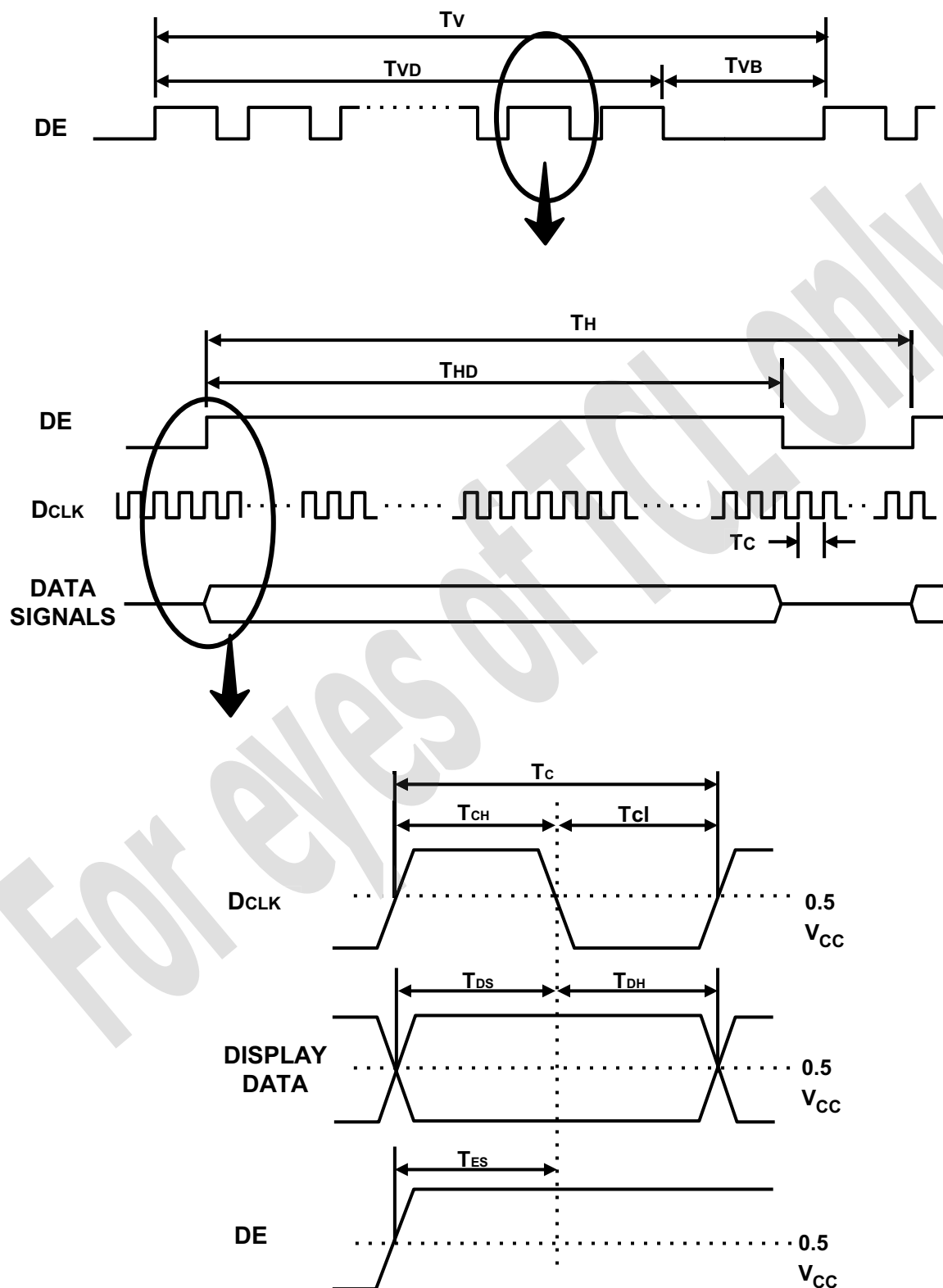
5.5 Power ON/OFF Sequence

To prevent a latch-up or DC operation of the LCD Module, the power on/off sequence should be as the diagram below.

1ms<T1≤10ms
1<T2≤50ms
0<T3≤50ms
1000ms≤T4

1000ms≤T5
(Recommend Value)
100ms≤T6
(Recommend Value)
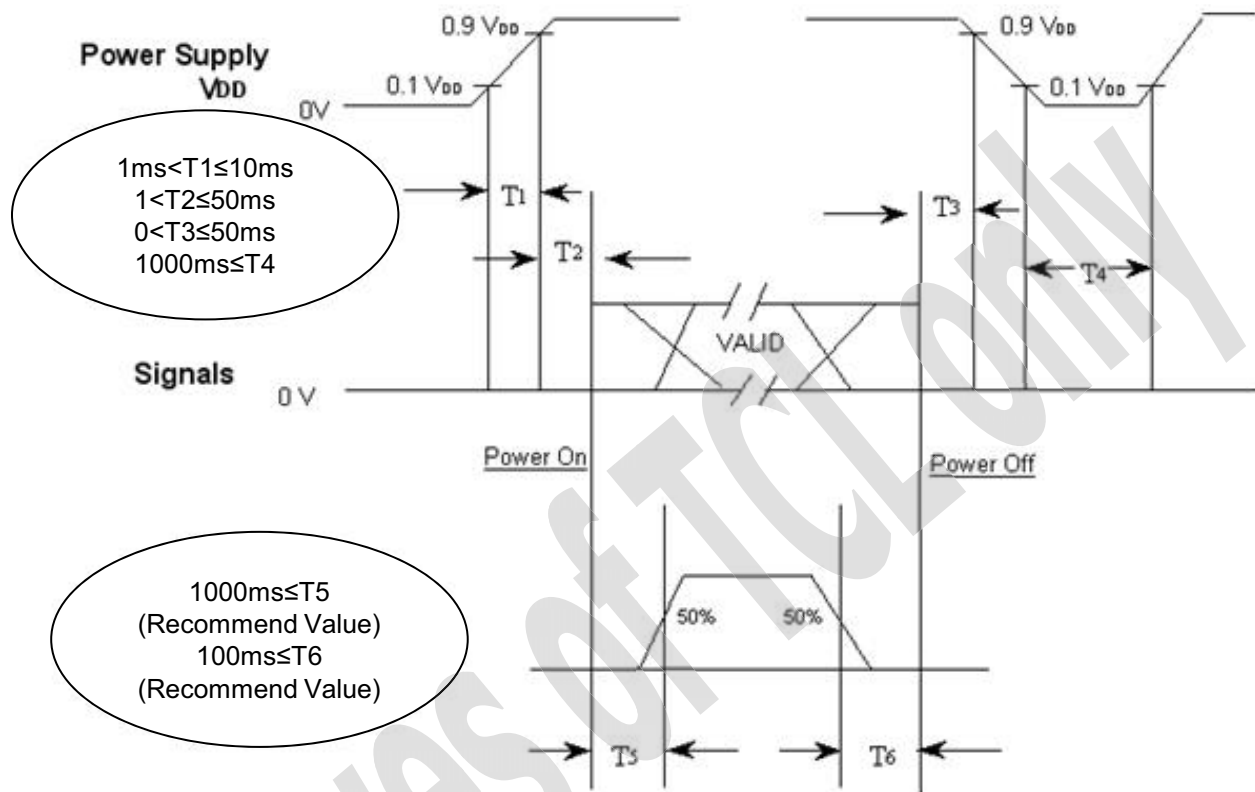
T1 : V_{DD} rising time from 10% to 90%
T2 : The time from V_{DD} to valid data at power ON.
T3 : The time from valid data off to V_{DD} off at power Off.
T4 : V_{DD} off time for Windows restart
T5 : The time from valid data to B/L enable at power ON.
T6 : The time from valid data off to B/L disable at power Off.

- The supply voltage of the external system for the Module input should be the same as the definition of V_{DD}.
- Apply the lamp voltage within the LCD operation range. When the back light turns on before the LCD operation or the LCD turns off before the back light turns off, the display may momentarily show abnormal screen.
- In case of V_{DD} = off level, please keep the level of input signals low or keep a high impedance.
- T4 should be measured after the Module has been fully discharged between power off and on period.
- Interface signal should not be kept at high impedance when the power is on.
- In Case T5 is less than 1000msec and T6 is less than 100msec, Garbage Display can be seen. (It is not related to electrical function issue, Just for recommendation to prevent Garbage Display)
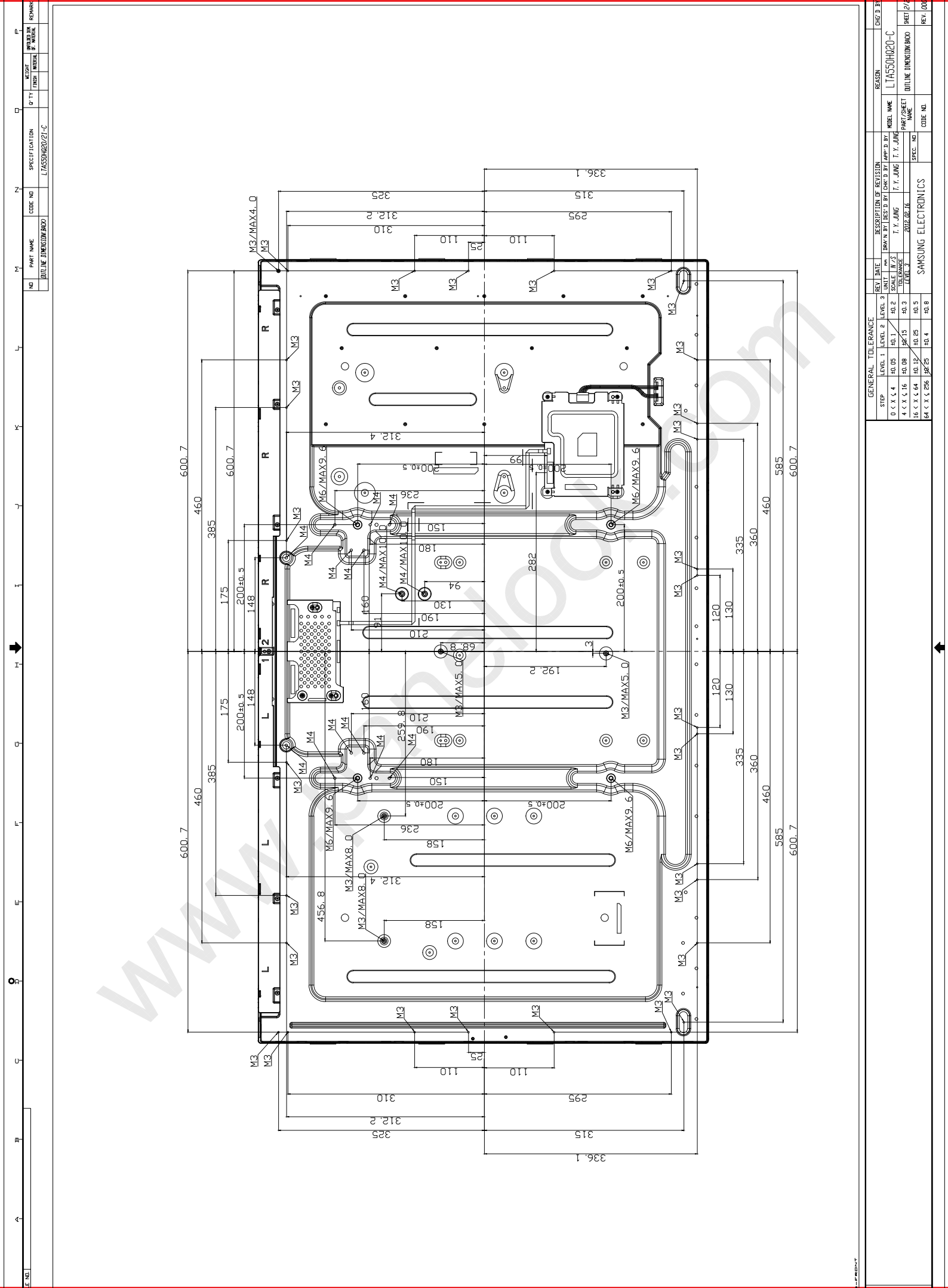
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SECTION A-A

18.4

13±0.2

1.1

22.7+3

15 +2

711.3±1<OUTLINE>

357.2

354.1

9.9

1237.4±1<OUTLINE>

22.7-1 +3

17

13

1209.6<ACTIVE AREA>

1217.9±1<BEZEL OPEN>

680.4<ACTIVE AREA>

688.4±1<BEZEL OPEN>

ACTIVE CENTER

9.9

13.9

ACTIVE AREA

13.9

9.9

31.7-1 +3

SECTION A-A

FRONT

* NOTE
1. BACKLIGHT : WLED
2. CONNECTOR SPECIFICATION
   - POWER CONNECTOR
     > MAKER : YEONHO
     > PART NO : 2202WR-H14B2
   - LVDS INPUT CONNECTOR
     > MAKER : JAE, WETECH
     > PART NO : 3711-005925
3. USERHOLE
   - TAP SIZE & TOLERANCE DESIGNED FOR GENERAL PURPOSE METRIC
     SCREW THREAD ACCORDING TO GENERAL GRADE OF "KS B 0211"
   - ALLOWD SCREW TORQUE
     > M3 TAP : 8.0 kgf.cm MAX (5 TIMES)
     > M4 TAP : 13.0 kgf.cm MAX (5 TIMES)
     > M8 TAP : 25.0 kgf.cm MAX (5 TIMES)
     (SCREW REPEATED INSERTION WARRANTY : 5TIMES)
4. GAP BETWEEN TOP CHASSIS AND GLASS IS 1.2mm<MAX>
5. WEIGHT :14,600 g<MAX>
6. BLACK MATRIX SPEC
   - IA - DI ≤ 2.0 mm
   - IC - DI ≤ 2.0 mm

BLACK MATRIX

NO	PART NAME	CODE NO
	OUTLINE DIMENSION(FRONT)	

SPECIFICATION LTA550HQ20/21-C

CODE NO: LTA550HQ20/21-C

PART NAME: OUTLINE DIMENSION(FRONT)

REMARK

UNTOLED DIM OF MATERIAL

MATERIAL

FINISH

WEIGHT

Q'TY

MODEL NAME: LTA550HQ20-C

PART/SHEET NAME: OUTLINE DIMENSION(FRONT)

SPEC. NO

CODE NO.

SAMSUNG ELECTRONICS

SHEET 1/2

REV. 000

GENERAL TOLERANCE			
STEP	LEVEL 1	LEVEL 2	LEVEL 3
0 < X ≤ 4	±0.05	±0.1	±0.2
4 < X ≤ 16	±0.08	±0.15	±0.3
16 < X ≤ 64	±0.12	±0.25	±0.5
64 < X ≤ 256	±0.2	±0.4	±0.8

UNIT : mm

SCALE : N/S

TOLERANCE : LEVEL 3

REV	DATE	DESCRIPTION OF REVISION	DRWN BY	DES'D BY	CHK'D BY	APP'D BY
			T.Y.JUNG	T.Y.JUNG	T.Y.JUNG	
	2012.02.16					

OUTLINE DIMENSION(LOW BACK)

LTA550HQ20-C

MODEL NAME

SAMSUNG ELECTRONICS

2012.02.16

7. Reliability Test

Item	Test condition	Quantity
TSS	-20℃ ~ 65℃, 440cycle determination	4EA
HTOL	50℃/60℃, 500hr determination	4EA
LTOL	-5℃, 500hr determination	4EA
HTS	70℃, 500hr determination	4EA
LTS	-25℃, 500hr determination	4EA
THB	50℃ / 90%RH, 500Hr determination	4EA
TS	-20℃ 0.5Hr → 60℃ 0.5Hr, 100cycle determination	4EA
ESD (non-operation)	Converter input connector : ±15 kV, 150pF/330 Ω, 3times/pin LED input connector : ±4 kV, 150pF/330 Ω, 3times/pin	3EA
ESD(operation)	contact : ±10 kV, 150pF/330Ω, 210 Point, 1 time/Point air : ± 20kV, 150pF/330Ω, 210 Point, 1 time/Point	3EA
POWER ON/OFF	-5℃/60℃, 3sec (on) / 2sec(off), 1000 times	4EA
Vibration	10 ~ 300Hz : 1.5G/10minSR, XYZ, 30min/axis [30~ 50Hz : 3G/10minSR, XYZ, 30min/axis]	3EA
Shock	11msec (±XYZ :30G)	3EA
Acoustic Noise	Electromagnetic noise : below 24dB Expansion/ Contraction noise by Heat : Max 50dB (Do not exceed 36dB more than 10times)	2EA
Temperature Humidity Stress	-20℃ ~ 65℃, 0 ~ 90%RH, 2cycle	4EA
PALLET Vibration	5~200Hz , 1.05Grms, Random 2Hr / Y	1PALLET
PALLET Drop	20cm, 2Edge	1PALLET
Complex	WHTS : Pallet Vibration/ Drop → WHTS → THB 48Hr HTS, LTS : Pallet Vibration/ Drop → HTS, LTS → HTOL 48Hr	WHTS 10EA HTS 4EA LTS 4EA

[Result Evaluation Criteria]
   Under the display quality test conditions with normal operation state, these should
   be no change which may affect practical display functions.

   *   HTOL/ LTOL : High/Low Temperature Operating Life
   ** THB   : Temperature Humidity Bias
   *** HTS/LTS   : High/Low Temperature Storage

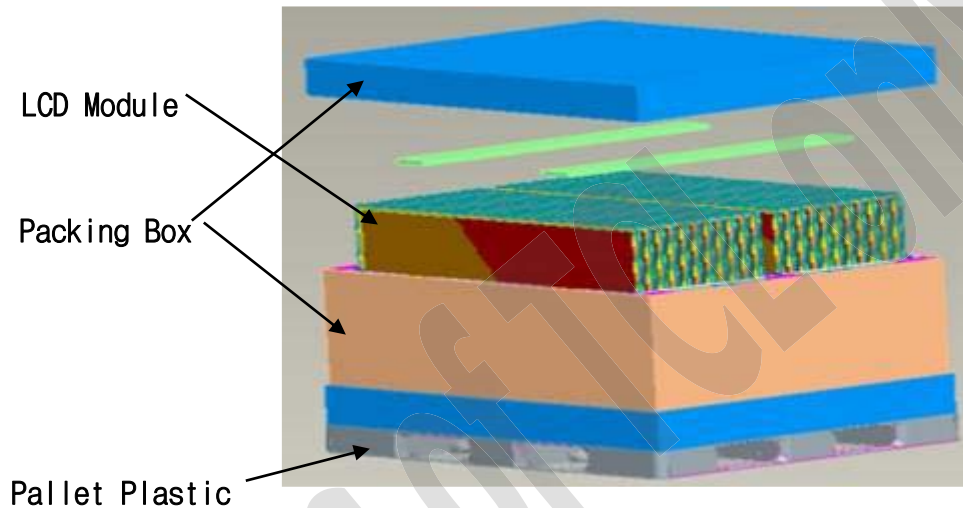| MODEL	LTA550HQ22	Doc. No	06-000-G-20120217	Page	22 / 27

8. PACKING

8.1 CARTON (Internal Package)
(1) Packing Form
Corrugated fiberboard box and EPS cushion as shock absorber
(2) Packing Method

LCD Module

Packing Box

Pallet Plastic

8.2 Packing Specification

Item	Specification	Remark
LCD Packing	22ea / Box	1. 299.2 Kg / LCD (22ea) 2. 32Kg / Packing Set 3. Packing Material Paper
Pallet	1Box / Pallet	9.3Kg
Packing Direction	Vertical	
Total Pallet Size	H x V x height	1133(H) x 1452(W) x 768(height)
Total Pallet Weight	374.26Kg	Module(299.2kg) + pallet (9.3kg) + packing set (32kg) + desiccant (1.76kg)

9. MARKING & OTHERS

A nameplate bearing followed by is affixed to a shipped product at the specified location on each product.

(1) Part number : LTA550HQ22
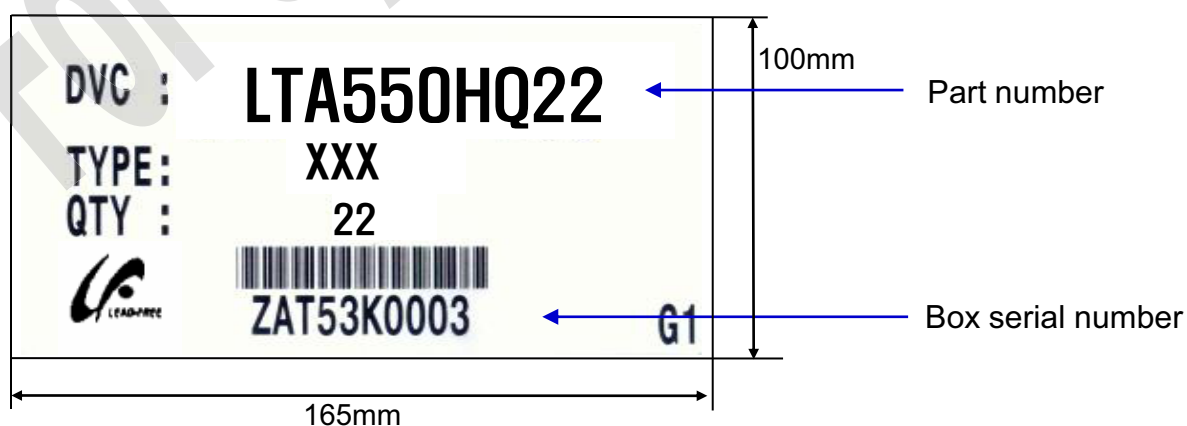(2) Revision: Three letters
(3) Lot number : X X X X XXX XX X

- Cell Position No. (In the Glass)
- Glass No. (In the one Lot)
- Lot No. (Glass)
- Month
- Year (Note1)
- Product code
- Line

(4) Nameplate Indication

T C ®UL us

LTA550HQ22

0925

XXXX

XXXXXXXXX　　　XXX

MADE IN KOREA

Week code : 09 25

- week
- year

40mm

Revision code

Lot number

80mm

(5) Packing box attach

DVC :　LTA550HQ22
TYPE:　XXX
QTY :　22

ZAT53K0003　　G1

100mm

Part number

Box serial number

165mm
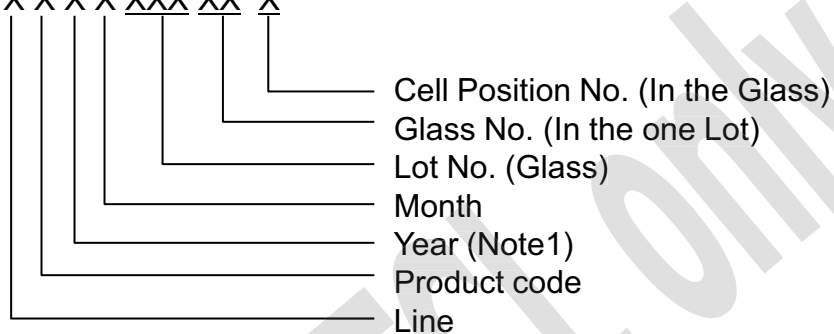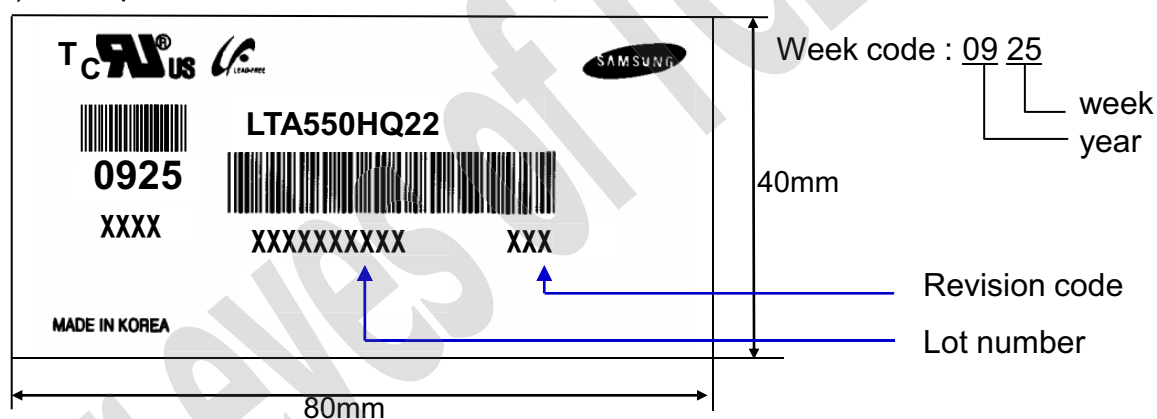
(6) Others
1. After service part
   Lamps cannot be replaced because of the narrow bezel structure.

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10. General Precautions

Samsung Secret

10.1 Handling

(a) When the Module is assembled, it should be attached to the system firmly using all mounting holes. Be careful not to twist and bend the Module.

(b) Because the converter use high voltage, it should be disconnected from power before it is assembled or disassembled.

(c) Refrain from strong mechanical shock and / or any force to the Module. In addition to damage, this may cause improper operation or damage to the Module and LED back light.

(d) Note that polarizers are very fragile and could be damage easily. Do not press or scratch the surface harder than a HB pencil lead.

(e) Wipe off water droplets or oil immediately. If you leave the droplets for a long time, staining or discoloration may occur.

(f) If the surface of the polarizer is dirty, clean it using absorbent cotton or soft cloth.

(g) Desirable cleaners are water, IPA(Isopropyl Alcohol) or Hexane. Do not use Ketone type materials(ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.

(h) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth . In case of contact with hands, legs or clothes, it must be washed away with soap thoroughly.

(i) Protect the module from Electrostatic discharge. Otherwise the ASIC IC or semiconductor would be damaged.

(j) Use finger-stalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.

(k) Do not disassemble the Module.

(l) Do not disassemble shield case of converter & LVDS board

(m) Do not connect N.C pins. (Samsung internal use only)

(n) Protection film for polarizer on the Module should be slowly peeled off just before use so that the electrostatic charge can be minimized. Must put on antistatic glove while handling a module

(o) Pins of I/F connector should not be touched directly with bare hands.

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10.2 Storage

ITEM	UNIT	Min.	Max.
Storage Temperature	(℃)	5	40
Storage Humidity	(%rH)	35	75
Storage Life	12 months		
Storage Condition	- The storage room should provide good ventilation and temperature control. - Products should not be placed on the floor, but on the Pallet away from a wall. - Prevent products from direct sunlight, moisture nor water; Be cautious of a build up of condensation. - Avoid other hazardous environment while storing goods. - If products delivered or kept in conditions of over the storage period of 3months, the recommended temperature or humidity range, we recommend you leave them at a temperature of 20℃ and a humidity of 50% for 24 hours.		

10.3 Operation

(a) Do not connect or disconnect the Module in the "Power On" condition.

(b) Power supply should always be turned on/off by the "Power on/off sequence"

(c) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference should be done by system manufacturers. Grounding and shielding methods may be important to minimize the interference.

(d) The cable between the back light connector and its converter power supply should be connected directly with a minimized length. A longer cable between the back light and the converter may cause lower luminance of LED package and may require higher startup voltage(Vs).

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10.4 Operation Condition Guide

(a) The LCD product should be operated under normal conditions.
Normal condition is defined as below;
- Temperature : 20±15℃
- Humidity : 55±20%
- Display pattern : continually changing pattern (Not stationary)

(b) If the product will be used in extreme conditions such as high temperature, humidity, display patterns or operation time etc.., It is strongly recommended to contact SEC for Application engineering advice. Otherwise, its reliability and function may not be guaranteed. Extreme conditions are commonly found at Airports, Transit Stations, Banks, Stock market, and Controlling systems.

10.5 Others

(a) Ultra-violet ray filter is necessary for outdoor operation.

(b) Avoid condensation of water. It may result in improper operation or disconnection of electrode.

(c) Do not exceed the absolute maximum rating value. (supply voltage variation, input voltage variation, variation in part contents and environmental temperature, and so on)
Otherwise the Module may be damaged.

(d) If the Module keeps displaying the same pattern for a long period of time, the image may be "sticked" to the screen.
To avoid image sticking, it is recommended to use a screen saver.

(e) This Module has its circuitry PCB's on the rear side and should be handled carefully in order not to be stressed.

(f) Please contact SEC in advance when you display the same pattern for a long time.

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